



RF Exposure Evaluation Report

Report No.: SET2013-01318

Product: WCDMA/GSM Module

FCC ID: SKH-SCV123

Brand Name: N/A

Applicant: Shenzhen Strong Rising Electronics Co.,Ltd

Address: Room 610-611, Building 13, Shangsha Creative Science&Tech
Park, Futian District, Shenzhen, China

Issued by: CCIC-SET

Lab Location: Electronic Testing Building, Shahe Road, Xili, Nanshan District,
Shenzhen, 518055, P. R. China

Tel: 86 755 26627338 **Fax:** 86 755 26627238

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Test Report

Product.....: WCDMA/GSM Module
Model No.: SEW290,SPW270,SPW290,STW290,PCI270,PCI290,
SEV550,SEV750,SEV850,MU270,MU290,MC550,MC750,
MC850,SEW270,SEW291,SEW702,STV680
Applicant.....: Shenzhen Strong Rising Electronics Co.,Ltd
Applicant Address.....: Room 610-611, Building 13, Shangsha Creative
Science&Tech Park, Futian District, Shenzhen, China
Manufacturer.....: Shenzhen Strong Rising Electronics Co.,Ltd
Manufacturer Address.....: Room 610-611, Building 13, Shangsha Creative
Science&Tech Park, Futian District, Shenzhen, China

Test Result: Pass

Tested by

Lu Lei Apr 20, 2013
Lu Lei, Test Engineer

Reviewed by.....:

Shuangwen Zhang Apr. 24, 2013
Shuangwen Zhang, Senior Engineer

Approved by.....:

Wu Li'an Apr. 20, 2013
Wu Li'an, Manager



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1 .General Information

1.1 Description of EUT

Product Feature & Specification	
DUT Type	WCDMA/GSM Module
Model Name	SEW290,SPW270,SPW290,STW290,PCI270,PCI290,SEV550,SEV750,SEV850,MU270,MU290,MC550,MC750,MC850,SEW270,SEW291,SEW702,STV680
FCC ID	SKH-SCV123
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz
Rx Frequency	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz
Antenna Type	Refer to Remark 2 and 3
HW Version	SPW9S-V4
SW Version	wup_2.00.008
Test of Modulation	GMSK/8PSK/QPSK

Remark 1: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Remark 2: The external antenna must be matched properly to achieve best performance regarding radiated power, DC-power consumption, modulation accuracy and harmonic suppression. Antenna matching networks are not included on the SEW290 Module PCB and should be placed in the host application.

Remark 3: An antenna was used via a UHL Type Connector, whose maximum antenna gain was 2dBi for Band 850 and 2dBi for Band 1900.



1.2 Test specifications

ANSI Std C95.1-1992	Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3KHz-300GHz.(IEEE Std C95.1-1992)
RSS-102	Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands (Issue 4 of March 2010))
KDB 447498 D01V05	General RF Exposure Guidance

2 RF Exposure Limit Introduction

An estimation of MPE in this application for product is used to ensure if it complies to the rules of the standard in the regulation list above.

Maximum permissible exposure (MPE) refers to the RF energy that is acceptable for human exposure. It is broken down into two categories, Occupational/controlled and General population/uncontrolled.

Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

We analysis if it comply with the limits for General population/uncontrolled exposure. The FCC's MPE limits for field strength and power density are given in 47CFR 1.1310(Table below).These limits are generally based on recommended exposure guidelines published by the National Council on Radiation Protection and Measurements (NCRP), and also partly based on guidelines recommended by the American National Standards Institute (ANSI) in Section 4.1 of ANSI/IEEE C95.1.



Table: Limits For Maximum Permissible Exposure(MPE)

(A) Limits for Occupational/controlled Exposure				
Frequency Range(MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density(S) (mW/cm ²)	Averaging Time (minute) E ² , H ² or s
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/uncontrolled Exposure				
Frequency Range(MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density(S) (mW/cm ²)	Averaging Time (minute) E ² , H ² or s
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30
f=frequency in MHz *Plane-wave equivalent power density				

A rough estimation of the expected exposure in power flux density on a given point can be made with the following equation:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S=power density



P=power input to the antenna

G=numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the centre of radiation of the antenna

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user. Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the user's manual. Therefore, the S of the device is calculated with R=20cm, and if it is below the limit S, then we can conclude the device complies with the rules.

3 Conducted RF Output Power (Unit: dBm)

Burst Average power						
Band	GSM 850			GSM 1900		
Channel	128	190	251	512	661	810
Frequency(MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
GSM(GMSK)	31.76	31.63	31.72	28.43	28.18	28.16
GPRS(GMSK)	31.50	31.40	31.56	27.65	27.37	27.31
EDGE(8PSK)	27.45	27.35	27.61	24.16	24.42	24.17

Band	WCDMA Band V		
Channel	4132	4175	4233
Frequency(MHz)	826.4	835.0	846.6
WCDMA	22.41	22.21	22.25
HSDPA Subtest-1	21.68	21.69	21.67
HSDPA Subtest-2	21.57	21.47	21.55
HSDPA Subtest-3	20.85	20.67	20.75
HSDPA Subtest-4	20.87	20.68	20.73



HSUPA Subtest-1	21.67	21.49	21.61
HSUPA Subtest-2	19.73	19.77	19.53
HSUPA Subtest-3	20.50	20.48	20.42
HSUPA Subtest-4	19.42	19.51	19.49
HSUPA Subtest-5	21.36	21.48	21.38

4.RF Exposure Evaluation

Frequency Band (MHz)	GSM 850	GPRS 850	EDGE 850
Antenna Gain (dBi)	2.00	2.00	2.00
Antenna Gain (numeric)	1.59	1.59	1.59
Power(mW)	1499.69	1432.19	576.77
R(cm)	20	20	20
S(mW/cm2)	0.47	0.45	0.18
MPE Limit(mW/cm2)	0.55	0.55	0.55
Conclusion	pass	pass	pass

Note:

GSM850/GPRS850/EDGE850:(uplink: 824-849MHz, downlink: 869-894MHz)

For the GPRS and EDGE mode, all the slots and channels were tested and just the worst data was record in this report.

According to the Table, we can conclude the max power density level at 20 cm is 0.47mW/cm², which is below the uncontrolled exposure limit of 0.55mW/cm²at 824MHz, so we can conclude it is into compliance.

Frequency Band (MHz)	GSM 1900	GPRS 1900	EDGE 1900
Antenna Gain (dBi)	2.00	2.00	2.00
Antenna Gain (numeric)	1.59	1.59	1.59
Power(mW)	696.63	582.10	276.69
R(cm)	20	20	20
S(mW/cm2)	0.22	0.18	0.09
MPE Limit(mW/cm2)	1.00	1.00	1.00
Conclusion	pass	pass	pass



Note:

GSM1900/GPRS1900/EDGE1900:(uplink: 1850-1910MHz, downlink: 1930-1990MHz)

For the GPRS and EDGE mode, all the slots and channels were tested and just the worst data was record in this report.

According to the Table, we can conclude the max power density level at 20 cm is 0.22mW/cm², which is below the uncontrolled exposure limit of 1.0mW/cm²at 1850MHz, so we can conclude it is into compliance.

Frequency Band (MHz)	WCDMA 850
Antenna Gain (dBi)	2.00
Antenna Gain (numeric)	1.59
Power(mW)	174.18
R(cm)	20
S(mW/cm ²)	0.06
MPE Limit(mW/cm ²)	0.55
Conclusion	Pass

Note:

WCDMA850:(uplink: 824-849MHz, downlink: 869-894MHz)

According to the Table, we can conclude the max power density level at 20 cm is 0.06mW/cm², which is below the uncontrolled exposure limit of 0.55mW/cm²at 824MHz, so we can conclude it is into compliance.

**** END OF REPORT ****